done as early as the condition of the patient warrants, permits the escape of a considerable quantity of peritoneal fluid which contains this ferment.

In a good many cases, as in Case II, reported by Dick,[20] recovery occurred after an early exploratory laparotomy, in which a few ounces of bloodstained fluid escaped and fat necrosis was observed; but the pancreas was not disturbed, and the abdomen was closed without drainage. How much good an operation of this extent may do is problematical. Drainage is always indicated, as it still further empties the peritoneal cavity, and tends to limit further necrosis of the pancreas. Some operators have made incisions into the gland, but the great tendency to hemorrhage from this organ and the difficulty of controlling it must not be forgotten. Ransohoff[21] has reported a case in which death evidently took place from hemorrhage, although the gland itself was not incised. The gall-bladder and ducts should be investigated and calculi removed, but the condition of the patient is usually such in these early operations that this procedure must be deferred to a later date. The extent of operation is still a moot question, and must depend largely on the patient's condition.

With the formation of pancreatic abscess the indication for extensive drainage is clear, and the earlier this is performed, before the patient is exhausted and septic, the better the prognosis. Even then a large percentage die. When it is remembered, however, that without drainage death is inevitable the duty of the physician is plain. In those cases in which an abscess can be made out in the region of the left kidney it may be reached through a lumbar incision, but in all other cases the abdominal route, with drainage through the gastrohepatic or possibly through the gastrocolic omentum would seem preferable, because of the greater accessibility and opportunity for more careful exploration.

THE EFFECT OF COLD AIR UPON THE CIRCULATION IN HEALTHY AND SICK INDIVIDUALS.[1]

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The following observations were carried out at the House of Relief to determine whether in cold air we possess an agent of any therapeutic efficiency for combating the vasomotor and cardiac weakness which so often complicate infectious diseases and postoperative conditions, and the treatment of which by drugs is so unsatisfactory.

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[20] Loc. cit.

[21] Ann. Surg., 1910, xli, 5, 670 to 681.

[1] Read before the Section in Medicine of the New York Academy of Medicine, February 20, 1912.

Preliminary experiments were conducted on 9 adults, who were either convalescent from operations or suffering from indifferent medical conditions like constipation, but whose circulations were apparently normal. They were in bed at least twelve hours before any observations were made. Systolic pressures were then taken in a warm room, every ten or fifteen minutes for an hour or longer, until the individual readings differed but slightly. Then the bed containing the patient was rolled from the warm room to the roof ward, which is open on three sides to the air. Each patient was well covered with blankets and a skull-cap, so that only the face was exposed. Blood-pressure readings were then made by the auscultatory method every five or ten minutes, by the same person, using a Stanton sphygmomanometer.

The following table summarizes our results:

Name.	Age.	Average systolic blood pressure in warm room.	Maximum blood pressure out-of-doors.	Maximum blood pressure attained in	Duration increased blood pressure.	Length of exposure.	Temp. out-of-doors.
S.	34	108	115	15 minutes	30 minutes	4 hours	21° F.
F.	45	120	145	30 minutes	4 hours	4 hours	22
....	..	118	118	....	....	45 minutes	38
....	..	111	146	3 hours	6 hours	8 hours	14
W.	18	104	108	20 minutes	40 minutes	1 hour	22
....	..	98	108	5 minutes	5 hours	12 hours	18
S.	45	107	124	15 minutes	2 hours	8 hours	44
....	..	105	110	15 minutes	1 hour	8 hours	25
G.	16	100	108	10 minutes	25 minutes	1 hour	22
R.	19	114	114	....	....	8 hours	14
D.	46	122	132	3 minutes	30 minutes	1 hour	22
K.	17	108	118	2 hours	6 hours	8 hours	14
H.	31	120	124	8 minutes	30 minutes	1 hour	30

Average blood pressure before exposure, 110; average blood pressure after exposure 120.

Eleven of the 13 experiments showed a rise of blood pressure varying between 4 and 35 millimeters of mercury, the average increase being equivalent to 10 millimeters. The maximum pressures were reached in from three minutes to three hours, persisted for varying lengths of time, and were often succeeded by a fall to the initial levels before the exposure had terminated. This is not a marked effect, for we found that 5 of these same men when kept quietly in bed in the ward showed an average daily variation of blood pressure amounting to 15 millimeters. Only the fact that in a majority of cases the rise occurred after a few minutes of exposure enabled us to attribute it to the cold air. It might be surmised that these initial rises were due to psychic or accidental causes rather than to the cold air. Had this been so the effect would have been transient, instead of persisting as it did. The pulse rate showed approximately no change. The diastolic pressures also varied but slightly, in the several cases in which they were read.

Van Oordt[2] has carried out somewhat similar experiments, exposing his patients, however, entirely uncovered to a temperature averaging 44° F., for periods varying between five and thirty minutes. In 5 normal adults he noted an average rise of systolic blood pressure equivalent to 12 millimeters of mercury. This is but slightly more than the rise in our men, who were, with the exception of the face, entirely covered; that is, stimulation of the nasal mucosa by air at a temperature varying between 14° and 23° F, caused about the same pressor effect in our subjects (presumably through

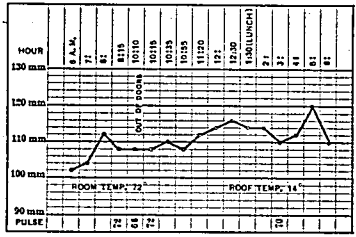

CHART 1.—Blood pressure reaction in normal individual with face exposed to cold air. Portions between circles represent observations made out-of-doors.

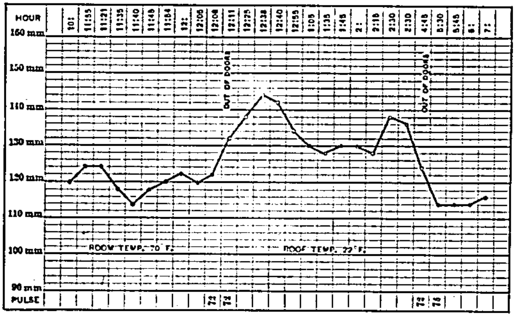

CHART 2.—This chart shows by far the most marked and consistent reaction we obtained The patient was a Chinese, suffering from constipation. A temperature of 38° produced no reaction, one of 22° a marked reaction (represented above), and one of 14° F. a still more marked and persistent rise.

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[2] Zeit. f. Diät. und physikal Therapie., ix, 1905-06, S. 338.

reflex action on the vasomotor centre) as was caused in Van Oordt's subjects, by exposure of the entire body to a temperature of 44° F.

Under the same conditions as obtained in the experiments on normal men, observations were then made in various forms of disease.

The following table summarizes our results with cases of lobar pneumonia. All of the men were actively sick, running high temperatures:

Name.	Age.	Day of disease.	Average syst. blood pressure in warm room.	Maximum syst. blood pressure out-of-doors.	Time exposed.	Temperature out-of-doors.
C.	31	3	125	126	8 hours	23° F.
O.	26	3	103	98	1 hour	23
O. C.	21	7	112	112	8 hours	23
E.	24	5	123	121	8 hours	35
S.	54	8	140	142	9 hours	18

The results were quite negative. There was no constant effect on the pulse.

We have observations on but 1 case of typhoid fever, in a man, aged twenty-seven years. The blood pressures were very low, varying between 60 and 100 almost from the first week.

	Ward.	Out-of-doors.	Ward.	Out-of-doors.
Day of disease	32–38	38–44	44–46	46–48
Temperature	99°–102°	99°–101.6°	99°–102°	normal 48th day
Average systolic blood pressure .	78	104	102	115
Average pulse rate	85	95	104	80
Temperature of air	68°	52°–50°	68°	42°–50°

It seems as if in this one case the out-of-doors treatment had a favorable effect on the blood pressure.

The following are the results in 2 cases of tuberculosis running high temperatures, 1 case of serofibrinous pleurisy, with moderate fever, and 1 case of cardiac insufficiency from chronic myocarditis.

Name.	Age.	Disease.	Average systolic blood pressure in warm room.	Maximum systolic blood pressure out-of-doors.	Maximum pressure attained in	Time of exposure.	Temp. out-of-doors.
Y.	31	Acute pneumonic phthisis	108	109	....	8 hours	33° F.
			112	122	7 hours	8 hours	13
M.	36	Tuberculous pleurisy	102	108	30 minutes	7 hours	33
			92	110	13 hours	8 hours	10
C.	25	Sero. fib. pleurisy	98	105	8 hours	8 hours	34
M.	44	Chronic myocarditis	150	148	....	8 hours	25

The fourth experiment is the only unquestionably positive one. There was no constant effect on the pulse in these cases.

Our attempts to influence the pulse or blood pressure being thus without result in practically all except one of our sick cases, it seemed worth while, in view of Van Oordt's experience, to see whether a greater exposure of our patients would have any positive effects. Accordingly, comparisons were made between the patient's condition when out-of-doors and warmly covered and when out-of-doors and covered with only a sheet. The time of exposure varied between thirty and thirty-five minutes. Cases with moderately high fever were selected, and as soon as the patient complained of feeling chilly the experiment was stopped.

The following table shows our results:

Name.	Diagnosis.	Average blood pressure before exposure.	Temp. immediately before exposure.	Max. blood pressure during exposure.	Temp. after exposure.	Difference in pulse.	Temp. of air.
S.	Pneumonia	108	103.0°	134	102.0°	None	38° F.
G.	Pneumonia	109	103.0	108	101.8	96-92	38
Y.	Acute pneumonic phthisis	138	102.8	142	102.0	110-108	38
		110	103.2	110	102.0	104-102	20
		118	....	120			

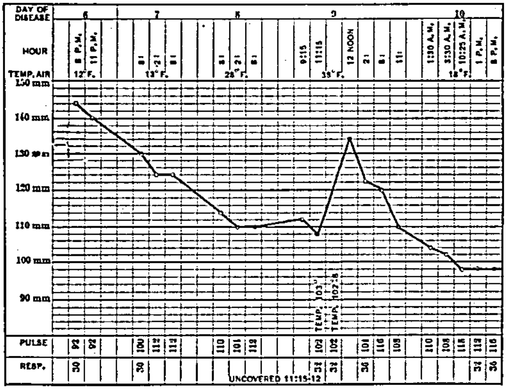

CHART 3.—Effect upon the blood pressure of a patient with pneumonia and delirium tremens when out-of-doors and covered and when only covered with a sheet.

The pulse was slowed and the temperature lowered in four experiments. The blood pressure was not markedly affected except in 1 case, a chart of which is given above. The patient was suffering from pneumonia and delirium tremens, but was quiet for some hours at the time of the experiment.

The summary of our results in the cold-air treatment of various infections shows that of 16 experiments carried out on 12 patients but 2 were positive, judging from the time of onset and degree of the rise in blood pressure. The heart was slowed in 4 of the experiments, in which the patient was covered with only a sheet. No sweeping conclusions can be drawn from an experience with so few cases, but the generally negative results make it seem improbable that the therapeutic value of cold air in diseases of adults is due to any dynamic effect on the circulation. That cold fresh air is of the utmost value in the treatment of infectious diseases is unquestionable, but its *modus operandi* must be sought in other directions.

CONCLUSIONS. 1. A slight rise of systolic blood pressure is produced in normal adults by exposure of the face to cold air. This rise persists for a varying length of time, and is often succeeded by a fall to the initial level, although the exposure be continued.

2. In 16 experiments carried out on 12 adults suffering from different infections the systolic blood pressure was increased decidedly but twice, as a result of exposing the patients to cold air.

LEUKOCYTE AND DIFFERENTIAL COUNTS IN WARD AND OPEN AIR TREATMENT.

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FEW observations have been made comparing the leukocyte counts of patients in the usual hospital ward with counts made in the open air. Cabot[1] states that prolonged cold bathing decreases the number of white cells in the peripheral circulation and dry cold does the same. Lenkei[2] found that cold-air baths caused a rise in leukocytes in a majority of cases, amounting to as much as 9.8 per cent. Van Oordt[3] has carried out some very complete experiments along this line. He exposed naked persons to an average temperature of 7° C., making leukocyte counts immediately before and at varying lengths of time after exposure. His conclusions were that cold air causes a leukocytosis in the skin capillaries which is produced by thermotaxis, and that this leukocytosis continues as long as the naked body is exposed to the cold air. Upon rewarming the

[1] Clinical Examination of the Blood, p. 189.

[2] Pester Med. Chir. Presse, May, 1910, xlvi, No. 20.

[3] Zeit. f. Diätetische u. physikal Therapie, 1905–6, ix, 338.